

WHAT IS CLAIMED IS:

1. A corneal surgery apparatus for ablating a cornea of a patient's eye by irradiation of a laser beam, the apparatus comprising:

an irradiation optical system for irradiating the laser beam onto the cornea;

image-pickup means for picking up an image of an anterior-segment of the eye;

mark detection means for processing the obtained image of the anterior-segment and detecting a mark provided to the eye;

reference position setting means for setting a reference position in which the mark being detected is to be positioned; and

torsion detection means for obtaining torsion information on the eye based on the detected mark and the set reference position.

2. The corneal surgery apparatus according to claim 1, wherein the reference position setting means detects a characteristic point common to a first image of the anterior-segment picked up in a condition where measurement data for determining data on corneal ablation is obtained and a second image of the anterior-segment picked up while being provided with the mark, detects the mark from the second image of the anterior-segment, and sets the reference position based on a detection result on the characteristic point and a detection result on

the mark.

3. The corneal surgery apparatus according to claim 2, wherein the reference position setting means sets the reference position based on the second image of the anterior-segment picked up by the image-pickup means and the mark detected by the mark detection means.

4. The corneal surgery apparatus according to claim 2, wherein the reference position setting means sets the reference position based on the first image of the anterior-segment from an ophthalmic apparatus for obtaining the measurement data, the ophthalmic apparatus having image-pickup means for picking up the image of the anterior-segment.

5. The corneal surgery apparatus according to claim 2, further comprising display means for displaying the first and second images of the anterior-segment,

wherein the reference position setting means includes designation means for designating the characteristic point common to each of the displayed images.

6. The corneal surgery apparatus according to claim 1, further comprising display means for displaying the obtained torsion information.

7. The corneal surgery apparatus according to claim 1, further comprising:

rotation means for rotating an irradiation position of the laser beam presented by the irradiation optical

system; and

rotation control means for controlling the rotation means based on the obtained torsion information.

8. The corneal surgery apparatus according to claim 7, wherein the rotation means includes at least one of an aperture which limits an irradiation area of the laser beam and a scanning mirror which scans the laser beam two-dimensionally in X and Y directions.

9. The corneal surgery apparatus according to claim 1, further comprising:

moving means for moving an irradiation position of the laser beam presented by the irradiation optical system two-dimensionally in X and Y directions; and

movement control means for controlling the moving means based on positional information on the detected mark.

10. The corneal surgery apparatus according to claim 1, further comprising irradiation control means for performing ON/OFF control of the irradiation of the laser beam based on the obtained torsion information.

11. A corneal surgery apparatus for ablating a cornea of a patient's eye by irradiation of a laser beam, the apparatus comprising:

an irradiation optical system for irradiating the laser beam onto the cornea;

an image-pickup unit which picks up an image of an anterior-segment of the eye;

a mark detection unit which processes the obtained image of the anterior-segment and detects a mark provided to the eye;

a reference position setting unit which sets a reference position in which the mark being detected is to be positioned; and

a torsion detection unit which obtains torsion information on the eye based on the detected mark and the set reference position.

12. The corneal surgery apparatus according to claim 1, wherein the reference position setting unit detects a characteristic point common to a first image of the anterior-segment picked up in a condition where measurement data for determining data on corneal ablation is obtained and a second image of the anterior-segment picked up while being provided with the mark, detects the mark from the second image of the anterior-segment, and sets the reference position based on a detection result on the characteristic point and a detection result on the mark.